Salinity Stratification in the Upper Meter of the Ocean Observed During STRASSE

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The Surface Salinity Profiler

Towed Platform:
Measures S/T
outboard of ship
wake

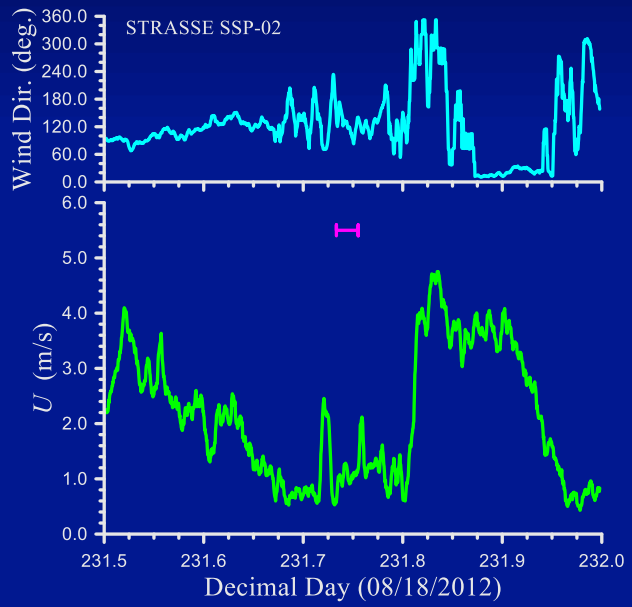
4 x SBE-49
CTDs

5 cm →
20 cm →
50 cm →
100 cm →

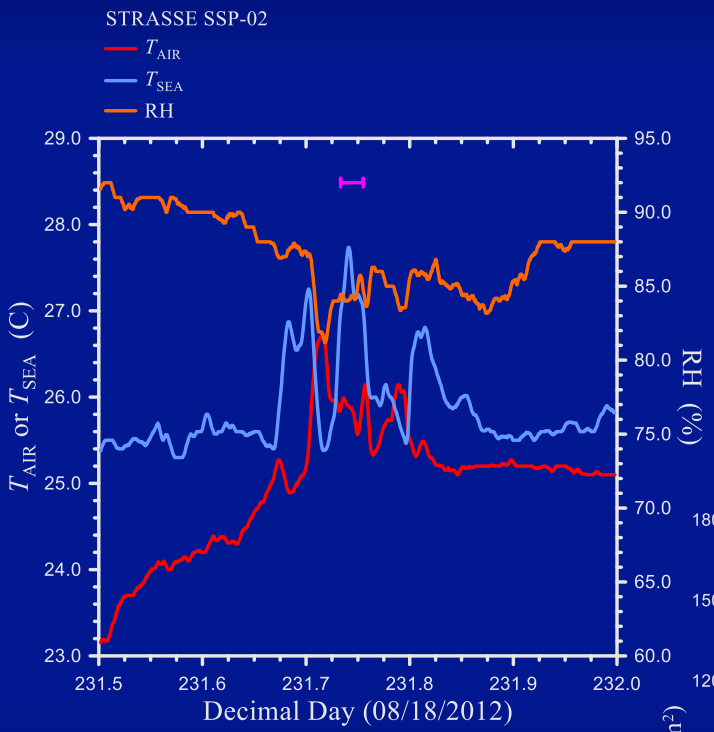
100 cm

The Surface Salinity Profiler

Salinity Stratification in the Upper Ocean
STRASSE SSP Deployment 02

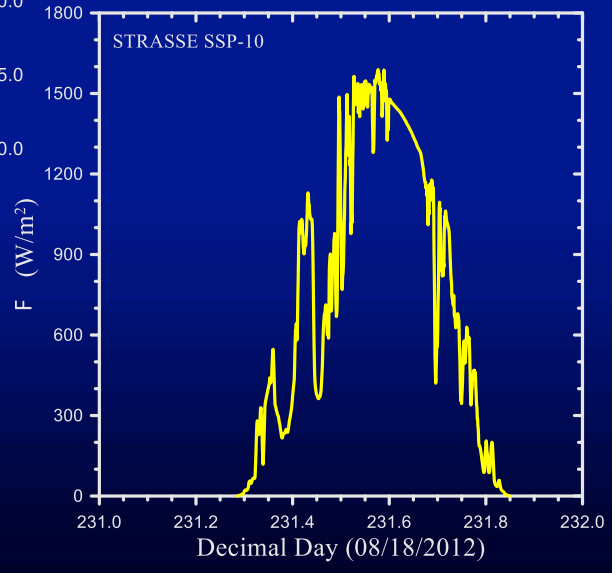


Low Wind

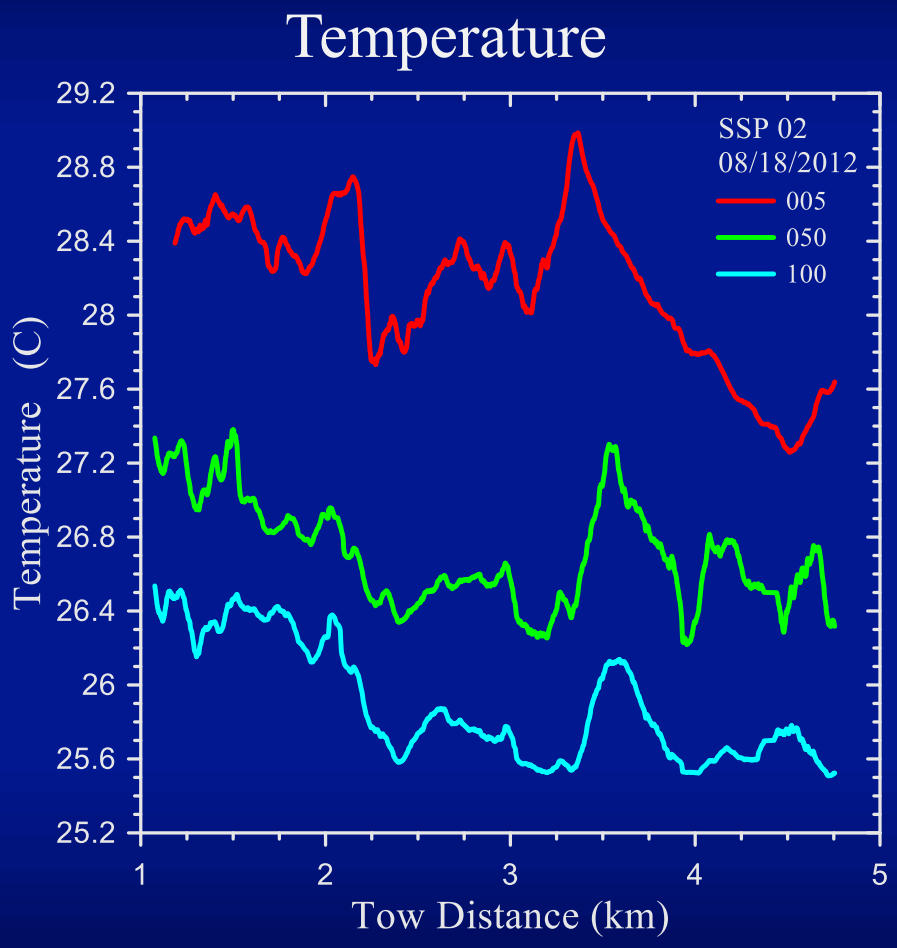


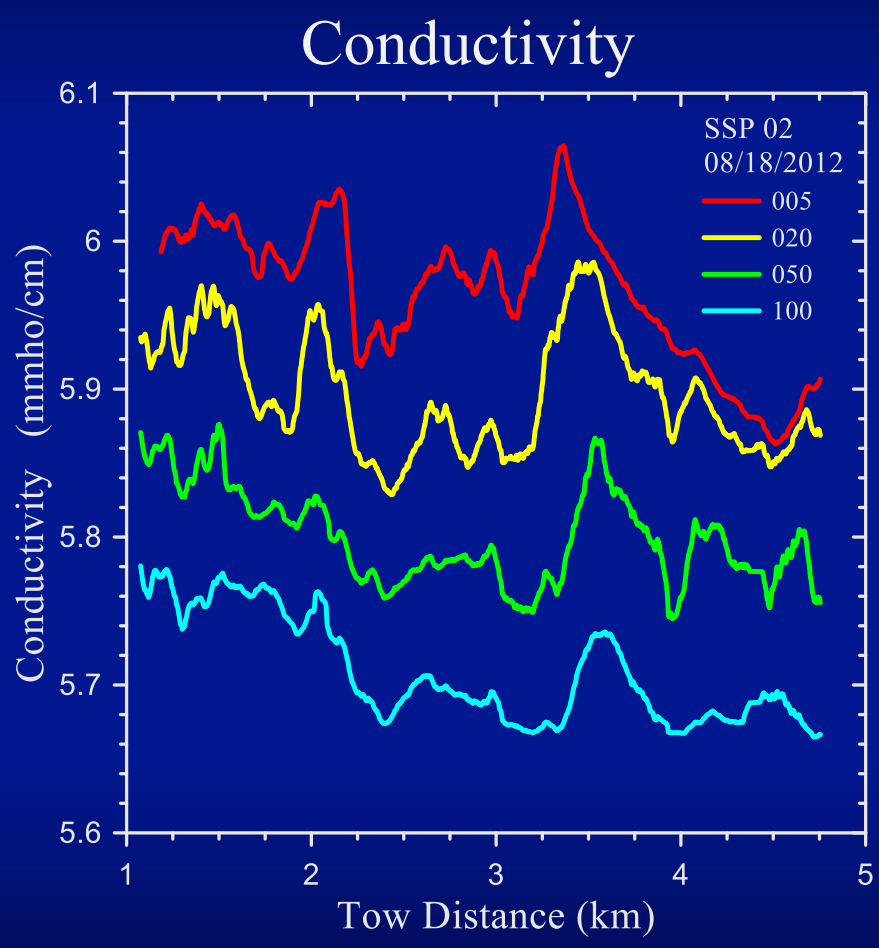
High $\Delta T_{\text{air-sea}}$
Q_{lat} upwards

High Φ_{SW}

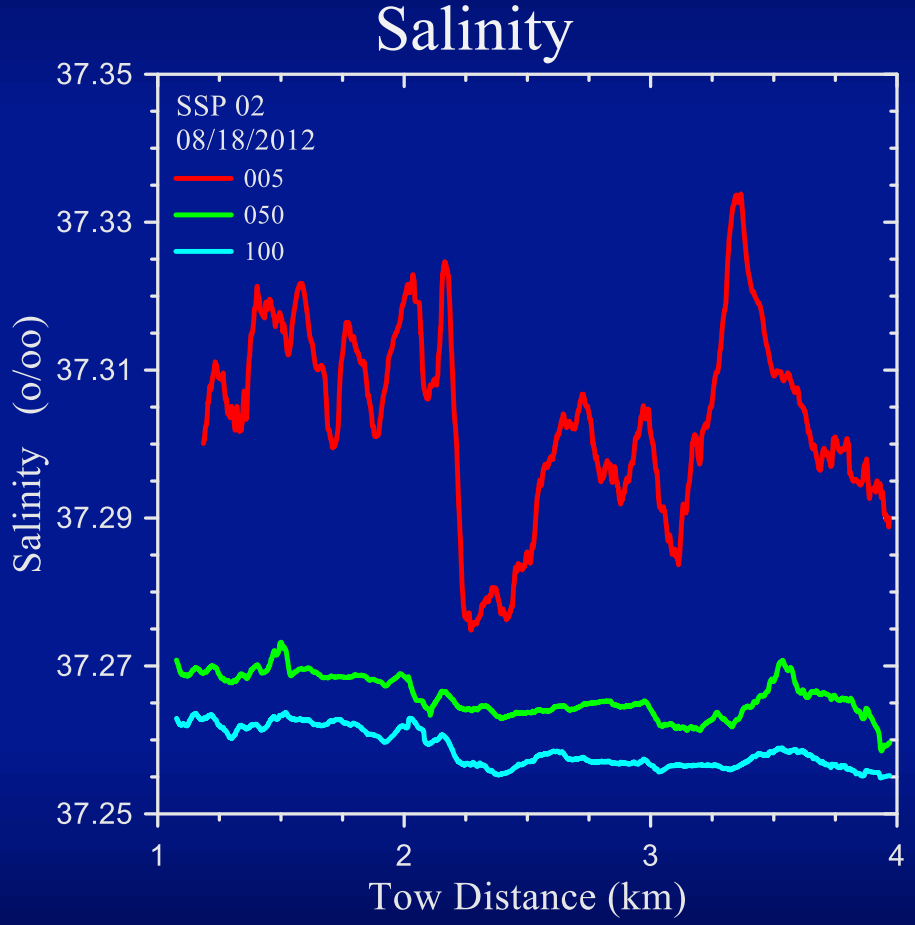


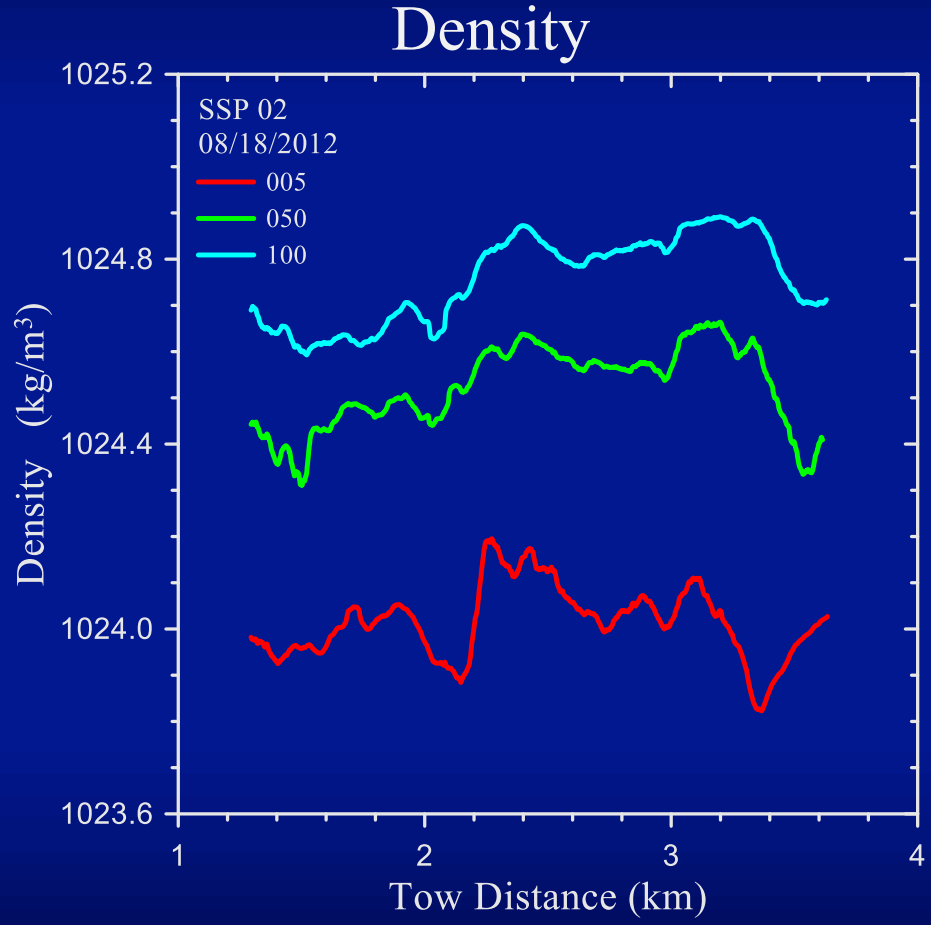
Time Series of Temperature and Conductivity From the SSP



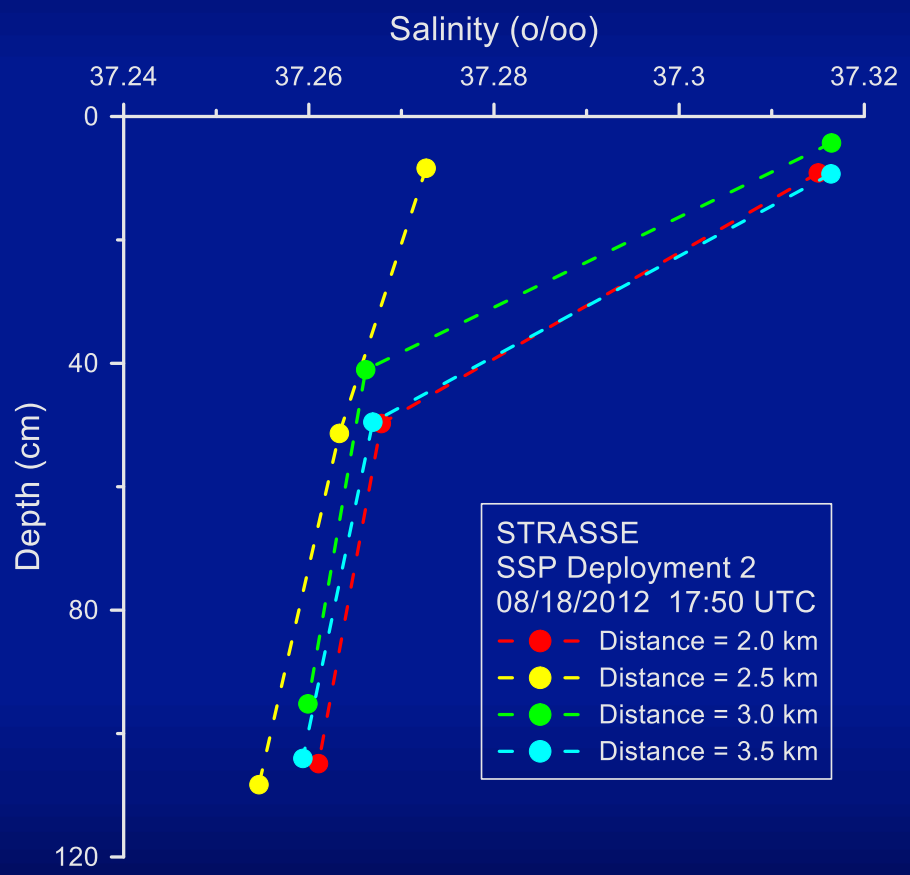


Upper Ocean Stratification Measured by the SSP





Density Stratification Measured by the SSP: Freshwater Flux: It is plausible?



From the bulk formula:

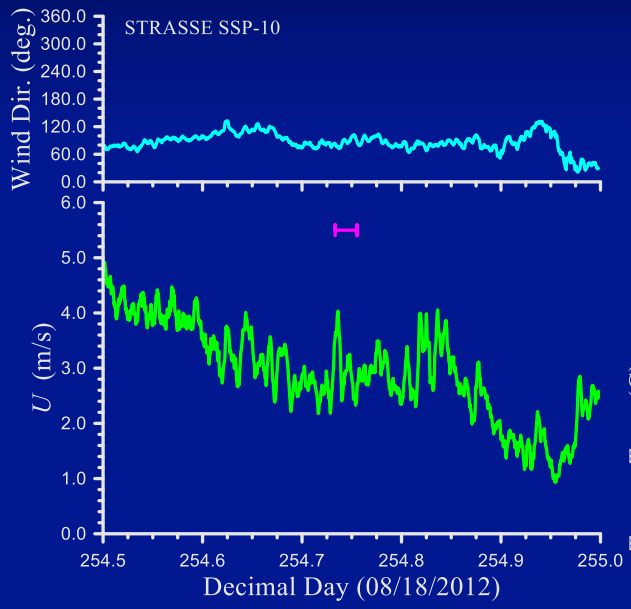
$$Q_{Lat} = \rho_A \Delta H_{vap} C_L U_{10} (q_W - q_A)$$

$$Q_{Lat} = 42 \text{ W/m}^2$$

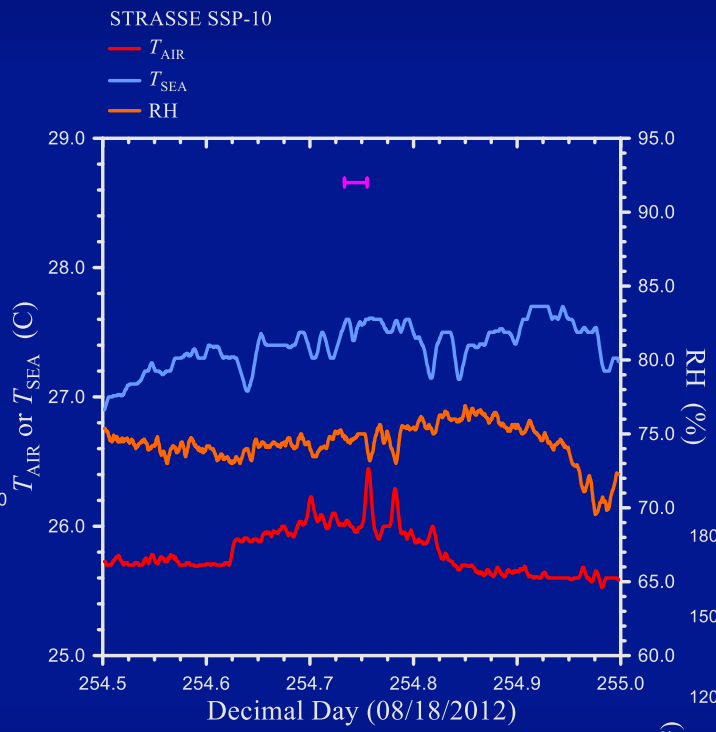
From estimating mass loss:

$$Q_{Lat} = 39 \text{ W/m}^2$$

Salinity Stratification Measured by the SSP: Case 2, STRASSE SSP-10 09/10/2012

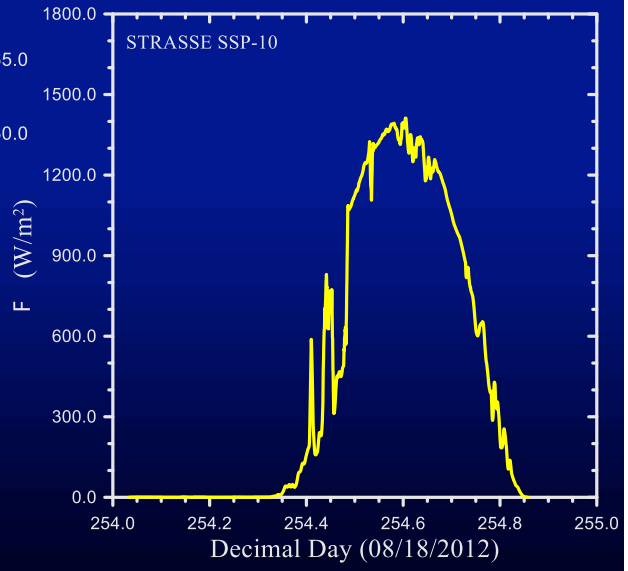


Low Wind

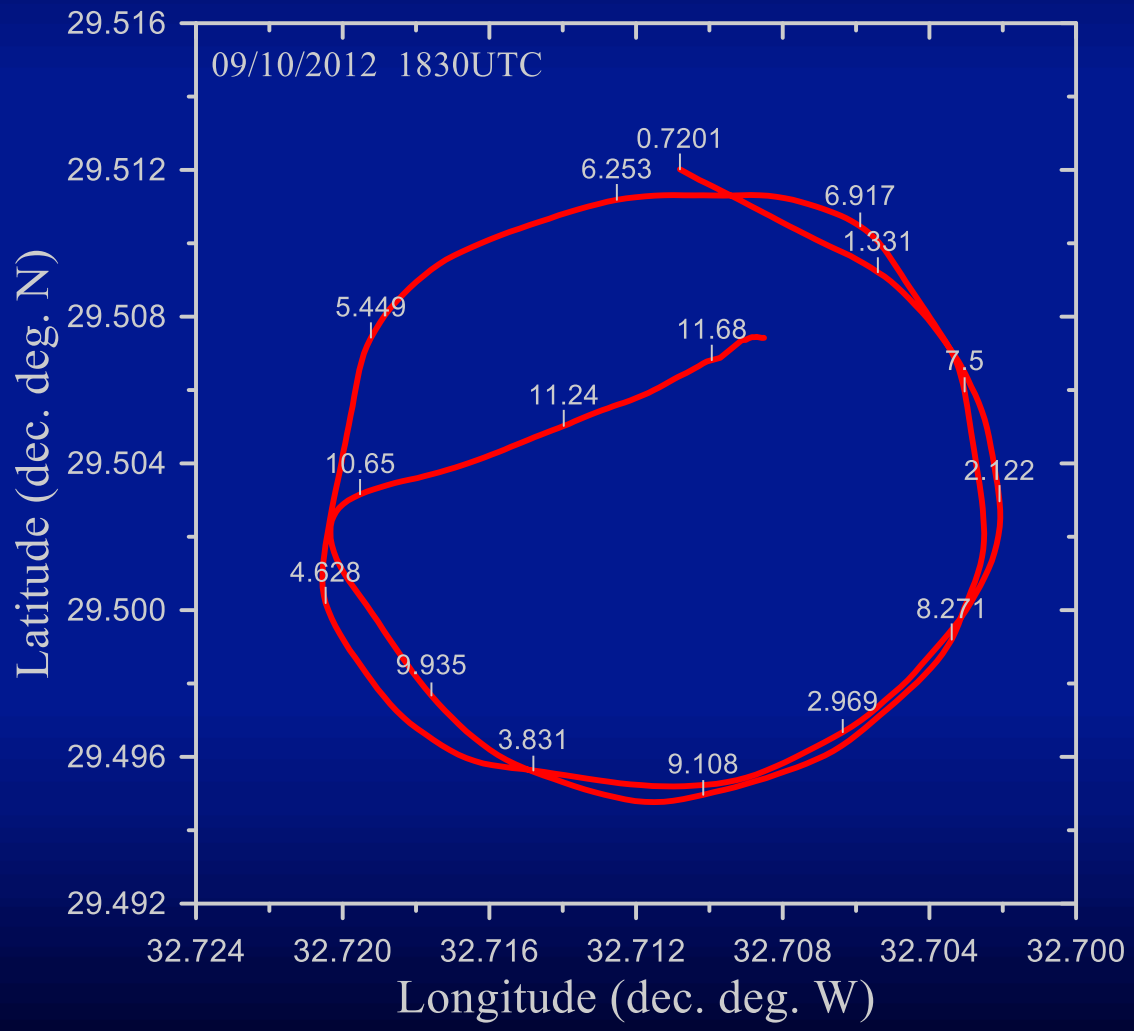


High $\Delta T_{\text{air-sea}}$
High Q_{Lat}

High Φ_{SW}

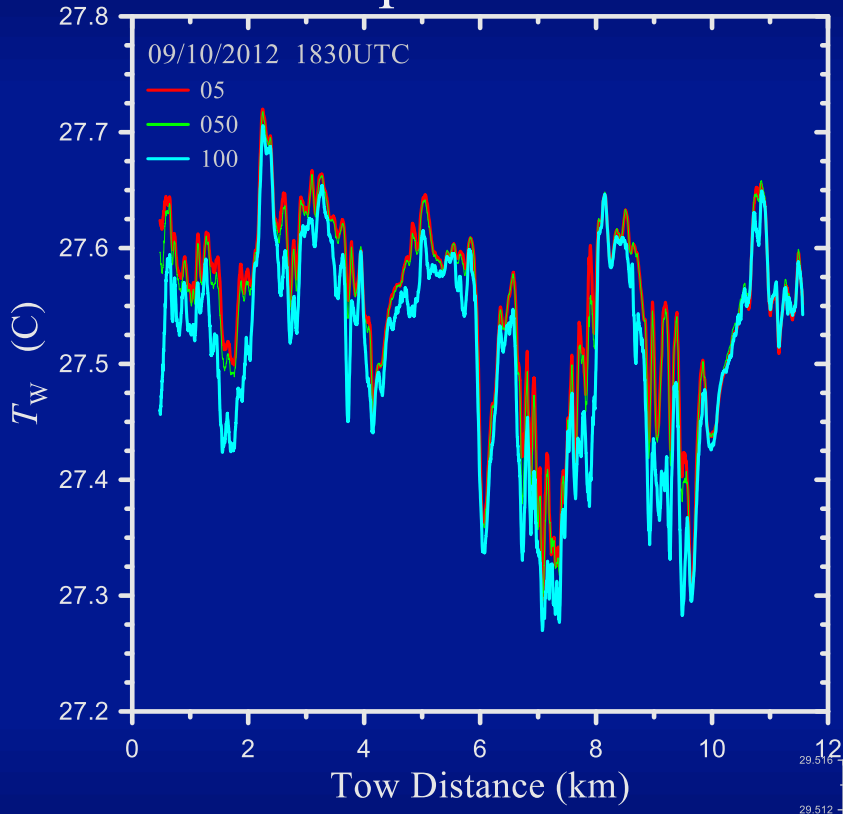


Salinity Stratification Measured by the SSP: Case 2, STRASSE SSP-10 09/10/2012

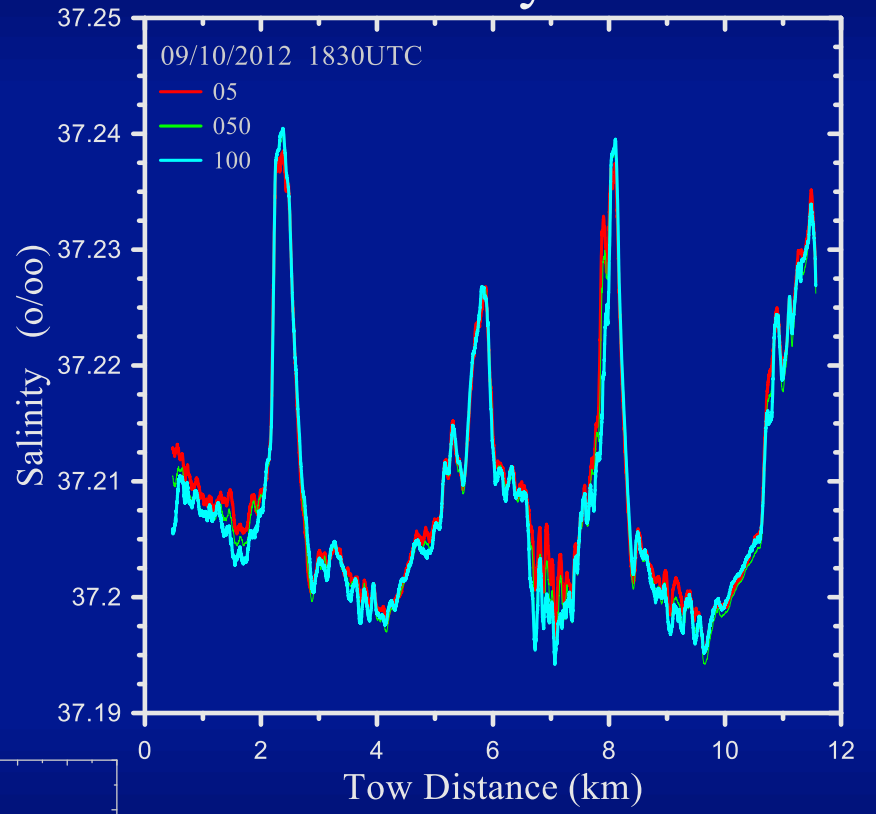


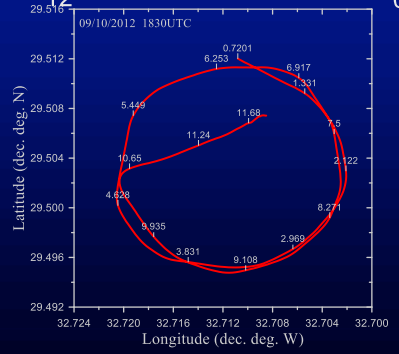
Salinity Stratification Measured by the SSP: Case 2

Temperature

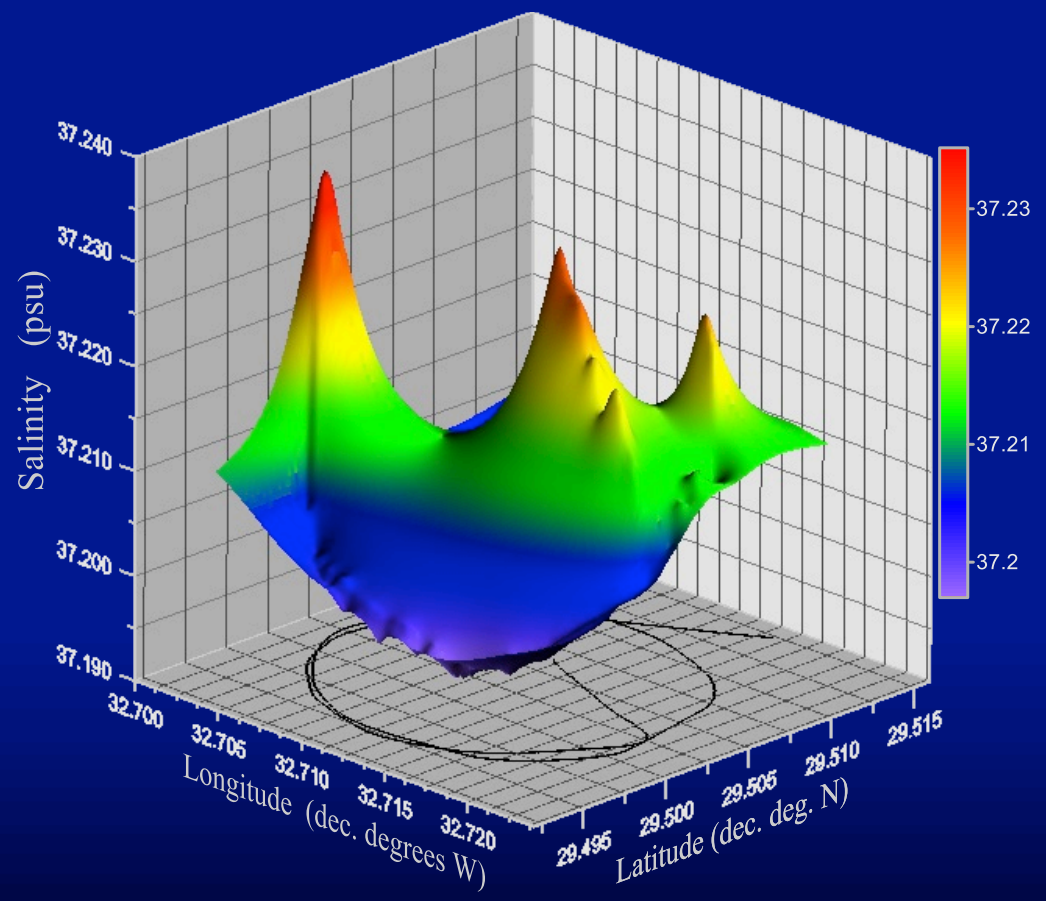


Salinity

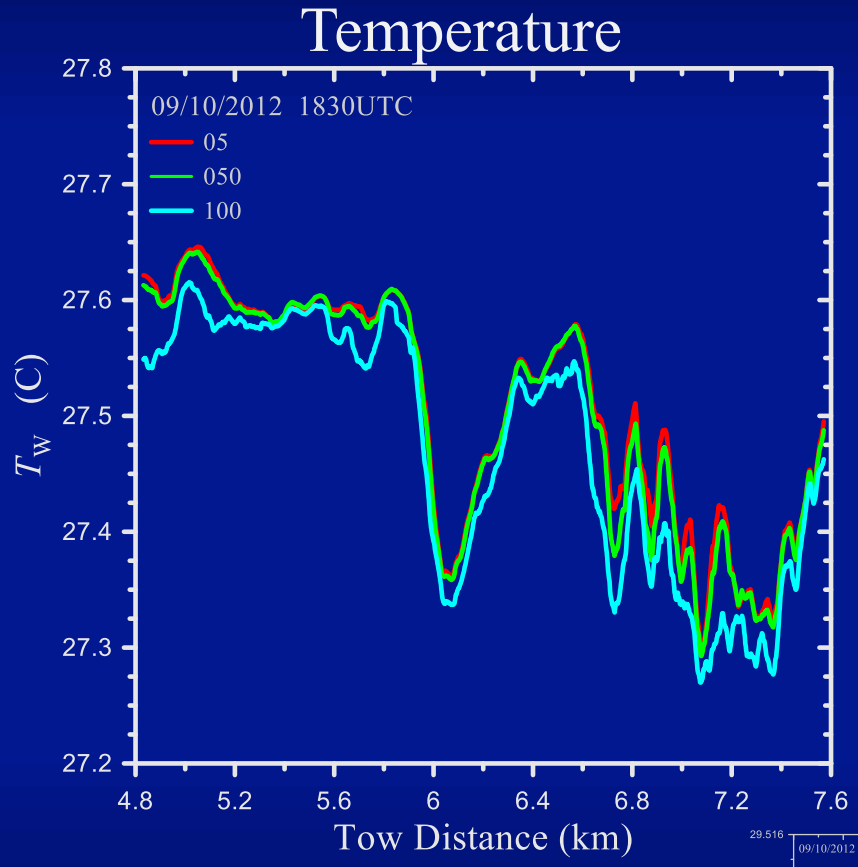


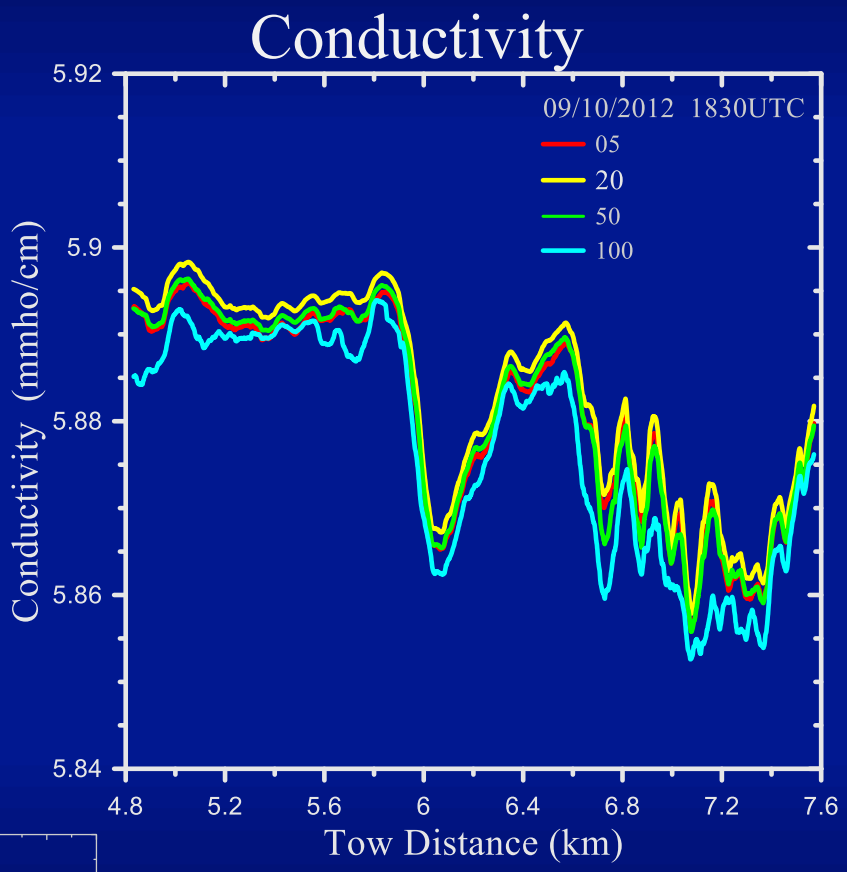


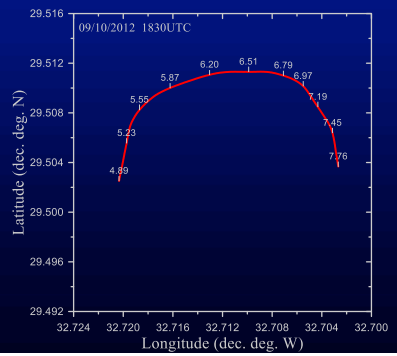
Salinity Contour at 50 cm from SSP data



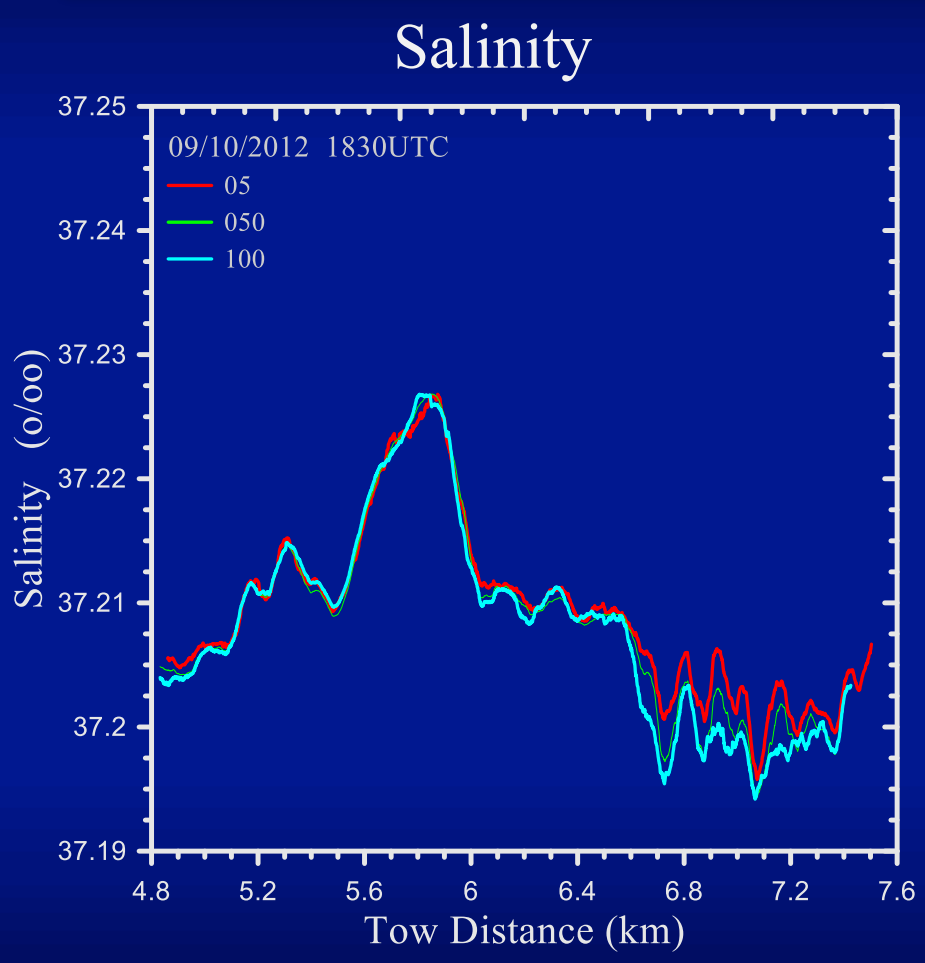
Case 2: Temperature/Conductivity Details

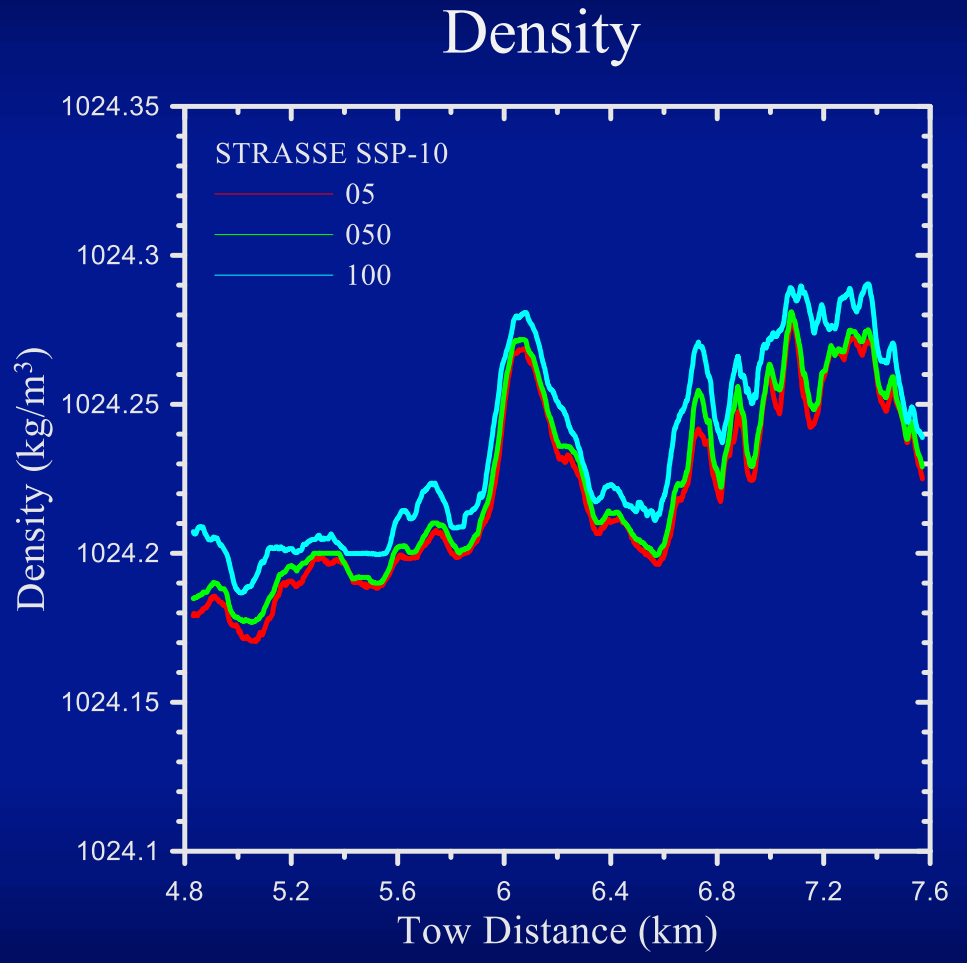






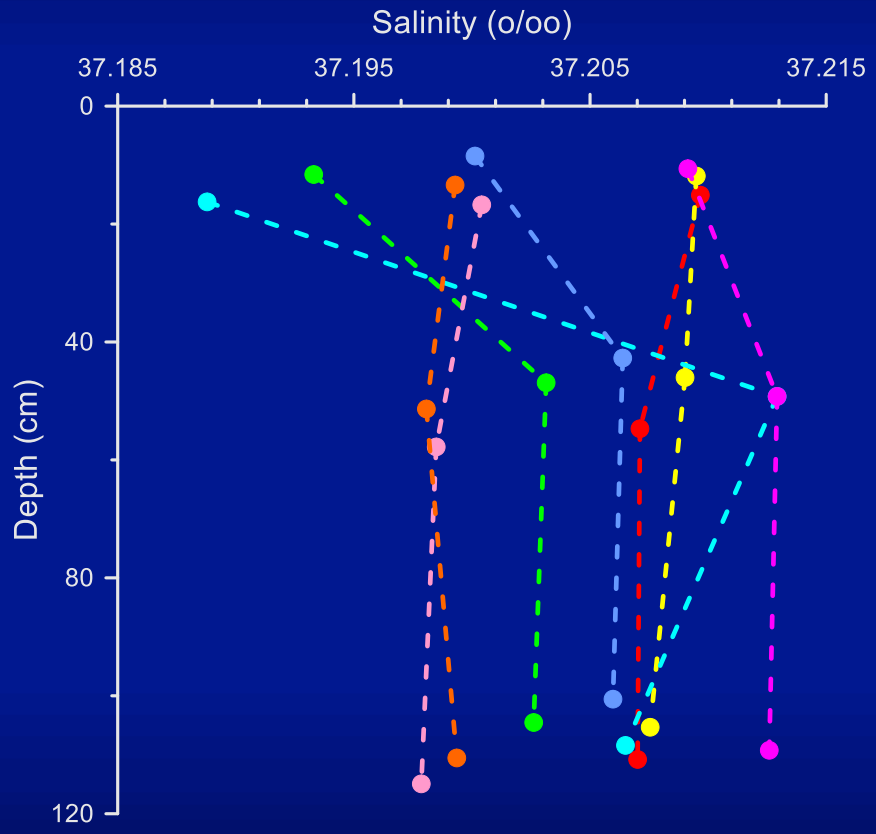
Case 2: Salinity/Density Details

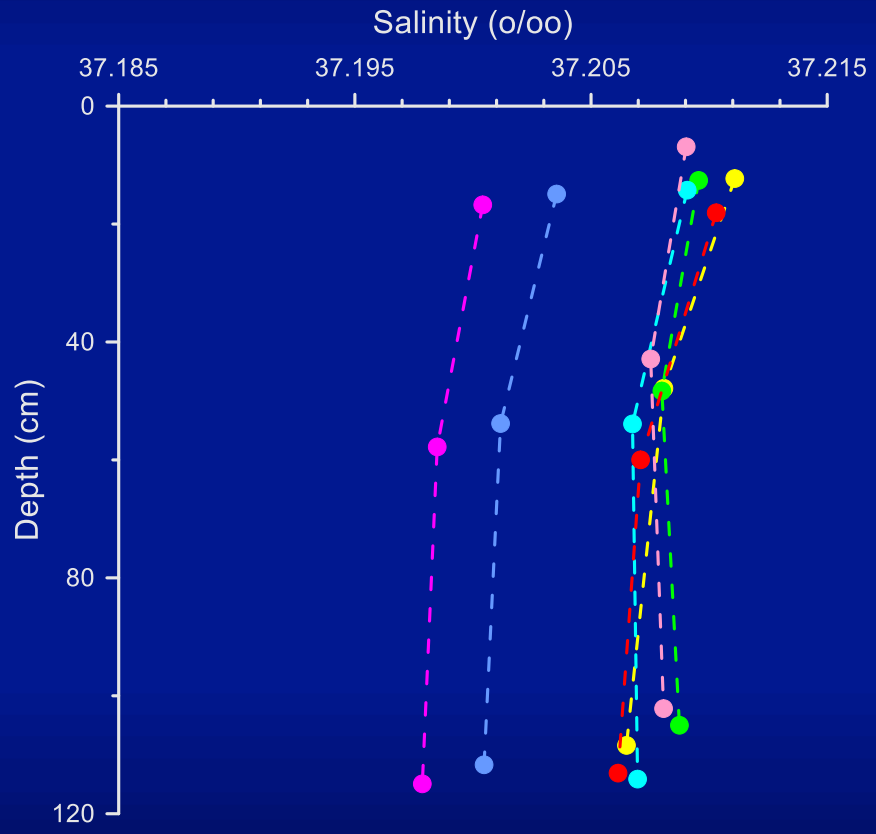




Case 2: Salinity Gradients

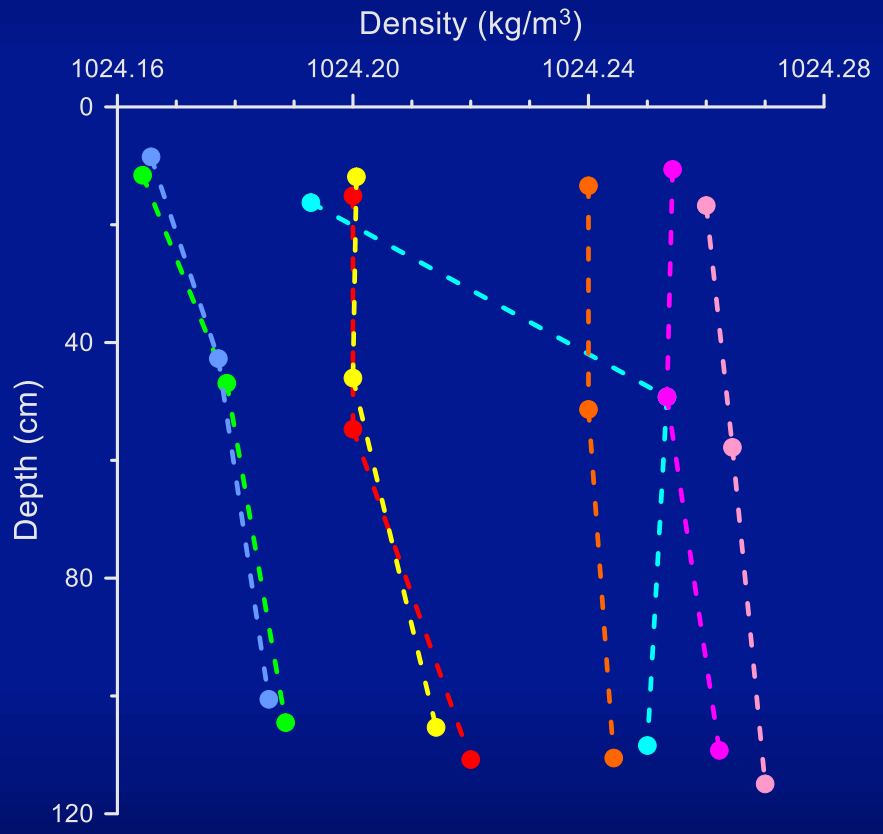
Well-mixed salinity vs. stratified salinity region

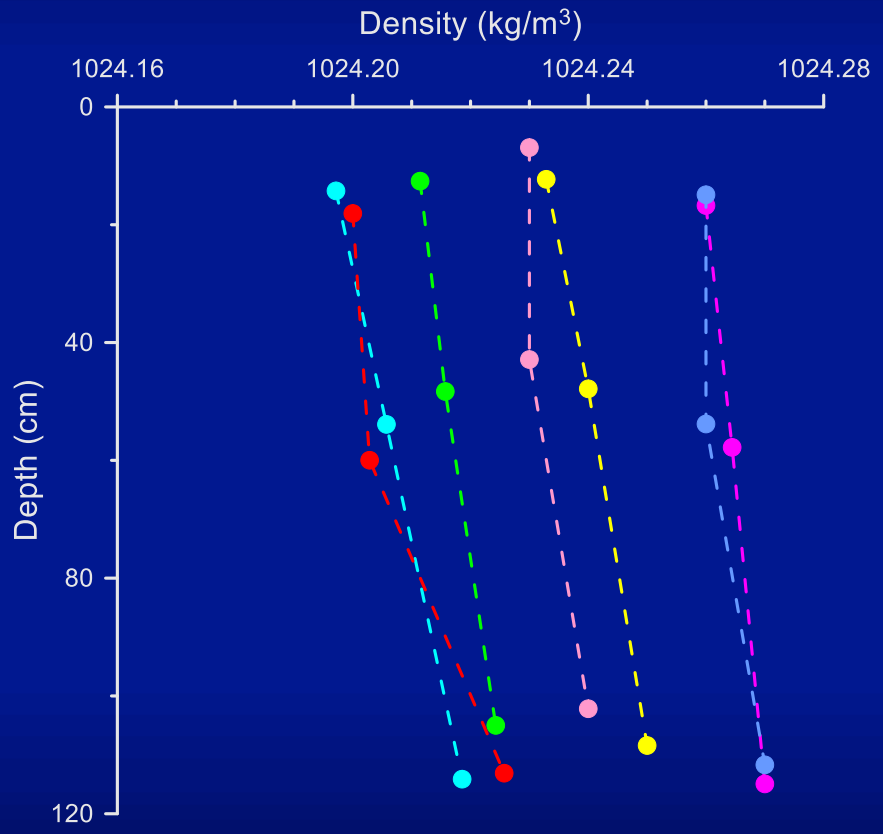




Case 2: Density Gradients

Well-mixed salinity vs. stratified salinity region





STRASSE Data Analysis: Further Work

Implement 1-D ocean mixed layer model to incorporate mixing, verify that positive salinity gradients can form due to evaporation with high insolation

Continue analysis of freshwater gradients measured in E. Equatorial Pacific